Update on analysis of the streamflow gaging network for the Puget Lowlands

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Objectives

- Inventory all continuous streamflow gages (active and inactive) operated in the Puget Sound Basin
- Assess the current capability of the network for monitoring stormwater impacts on small streams
- Identify opportunities to improve network capabilities through regionally coordinated monitoring

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Inventory of gages in the Puget Sound Basin

957 gages with locations and period of record in database

- locations need be verified with help from Stormwater Work Group
- some gages are located at the same site but have been operated by different agencies over time

Basins delineated from gages using 30 m National Elevation Data (NED)

- known to have errors especially in areas with engineered drainage systems, but this project does not have the resources to delineate/verify accurate basins for each gage.

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Evaluating the gaging network

1. Spatial coverage

2. Spatial resolution

3. Temporal coverage

Temporal resolution of records is daily but higher resolution data are available at many sites.

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Puget Lowland Ecoregion

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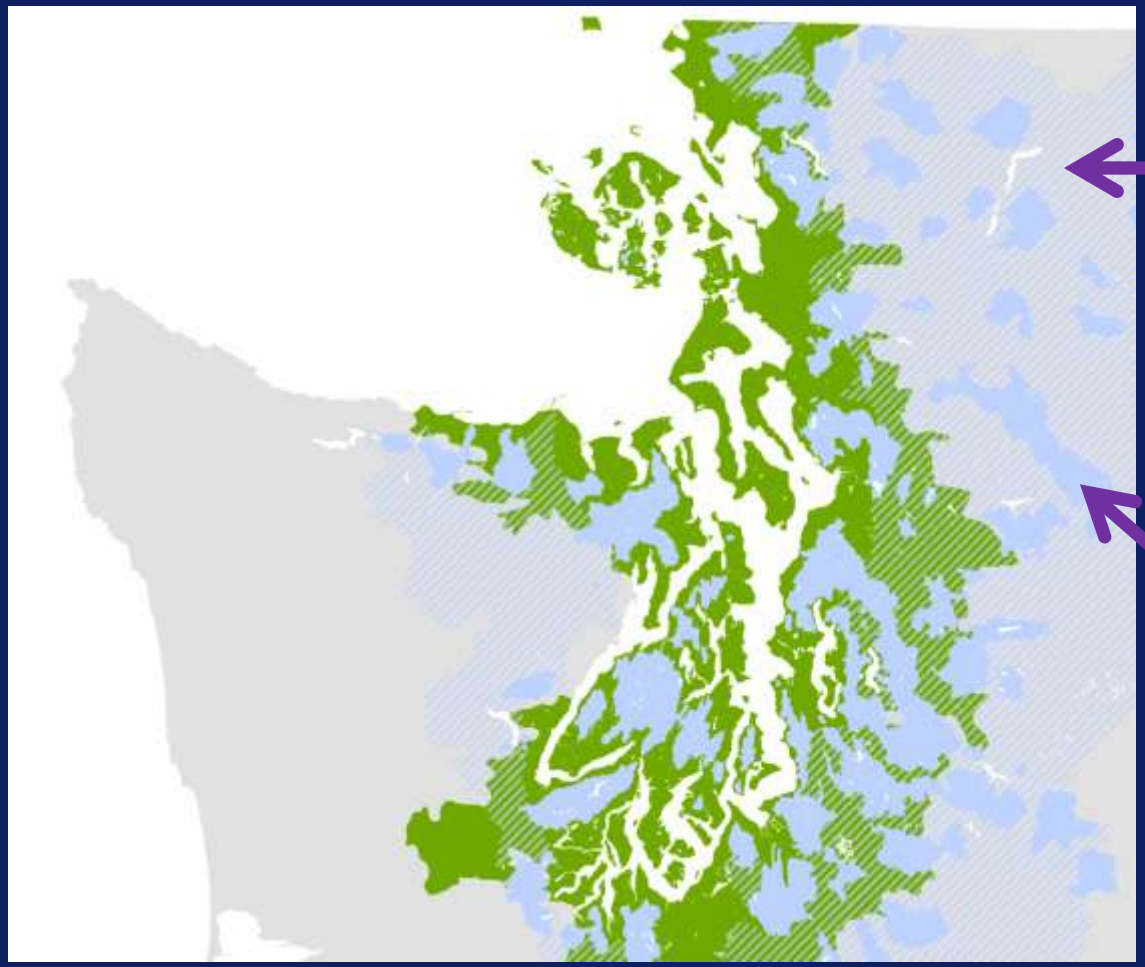
Coverage and resolution of the network



Area that drains to a gage

Area where the drainage basin of the gage is less than 100 km^2.

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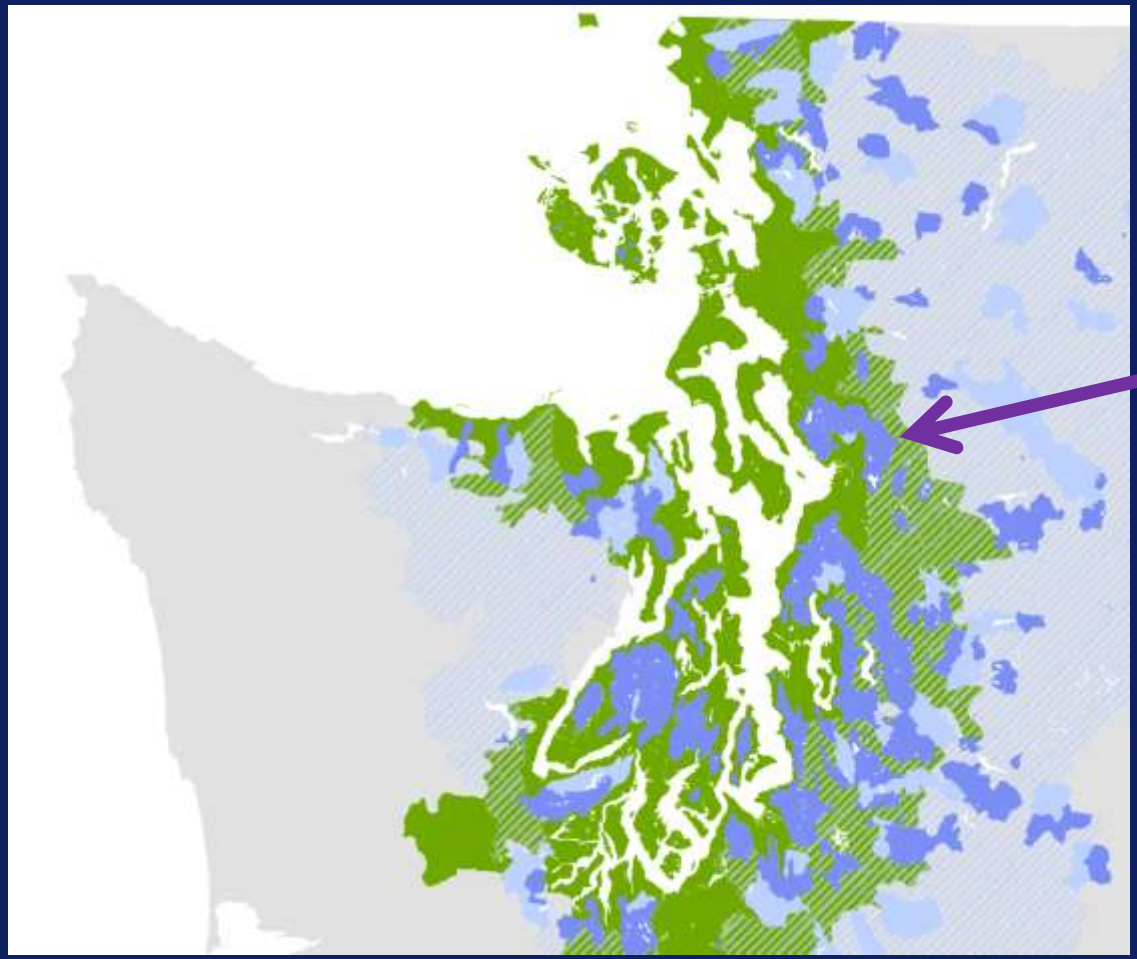
Medium resolution areas



Area where the drainage basin of the gage is less than 50 km^2.

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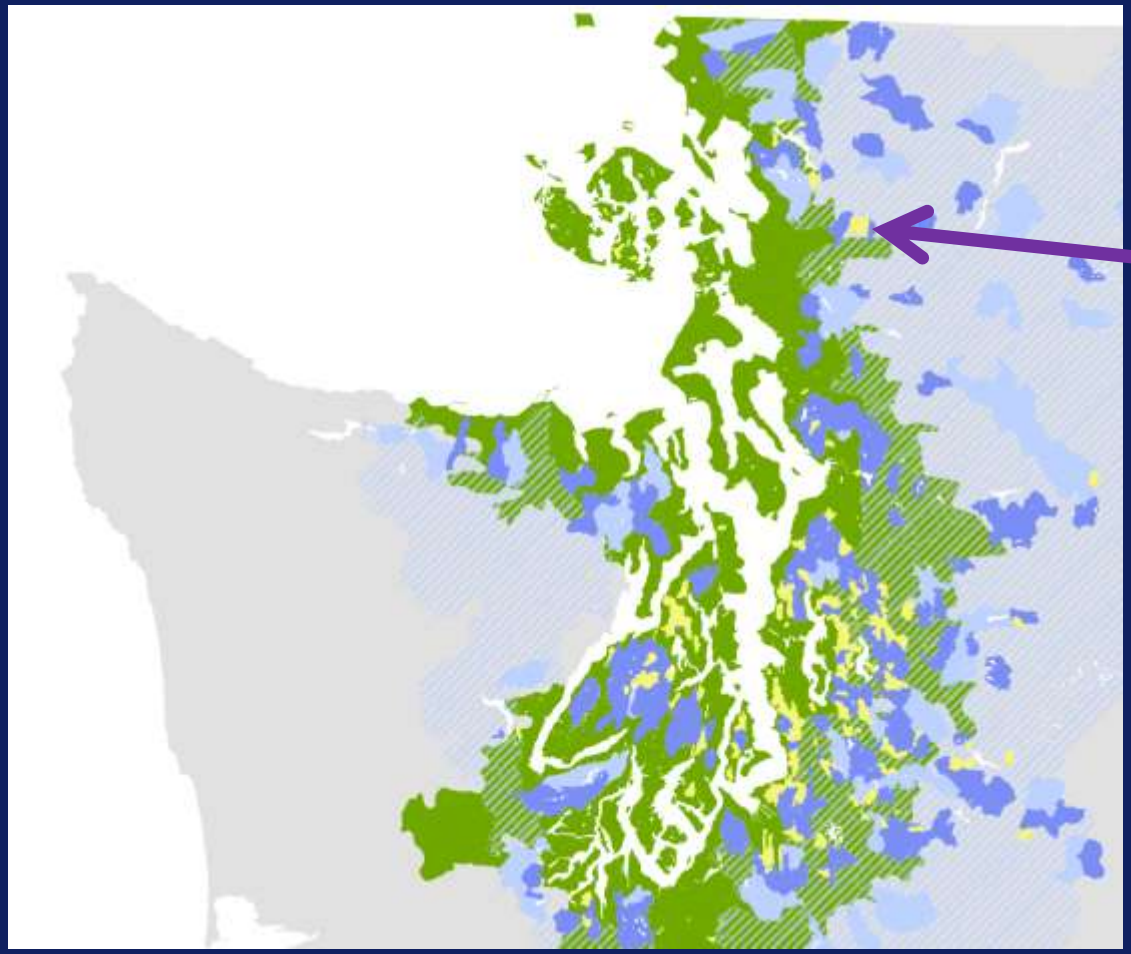
High resolution areas



Area where the drainage basin of the gage is less than 50 km^2.

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Coverage and Resolution

Evaluating the tradeoff between coverage and resolution depends on monitoring goals…but

- *it may be more feasible to expand coverage than to increase resolution through analysis (models).*

- *If so, high resolution sites (i.e., small drainage basin) and diversity of basin types would be preferable.*

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Index-station approach as an alternative to direct monitoring

If the streamflow gaging network is inadequate in terms of either resolution or coverage and cannot be expanded sufficiently then…*daily streamflow can be synthesized using a series of measurements at a site and correlating those measurements to an index station that has a long-term record.*

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Evaluating the network for application of an index-station approach

Spatial structure of correlation of daily streamflow between sites must be understood:

- *how does correlation of flows between sites depend on nesting (shared drainage area)?*
- *are there basin attributes (elevation, proximity, geology) that indicate high correlation of flows between sites?*

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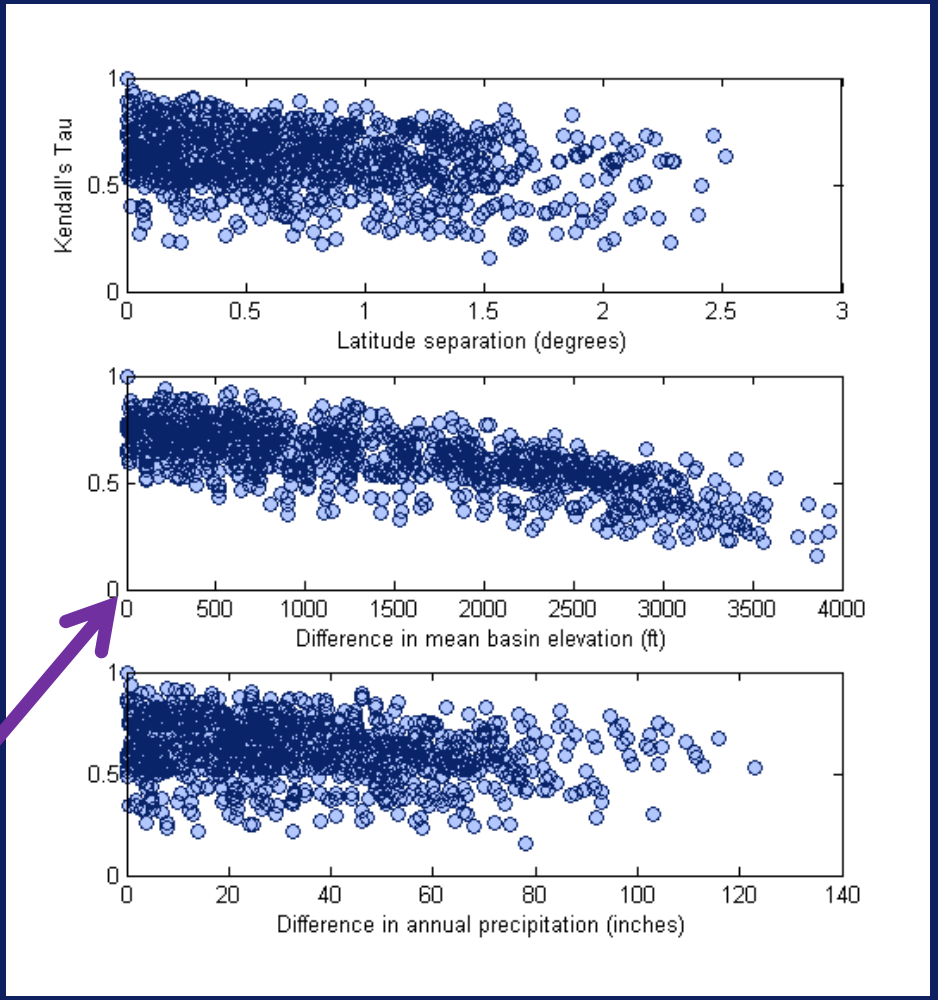
Correlation of daily flows between sites

Median correlation between any two gages: Kendall's Tau of 0.6

For the index station approach, we would like to find a gage with the highest correlation for each site. For gaged sites, the maximum correlation to another gage ranged from Kendall's Tau of 0.66 to 0.94.

Higher correlation between sites with similar elevation.



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Next Steps

- QA/QC locations.
- Summarize spatial coverage and resolution of network.
- Summarize temporal coverage in terms of period of record and recently active gages.
- Evaluate spatial structure of streamflow (correlation of daily flows) as a function of nesting and basin attributes.
- Complete draft report by October.

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